The MAC Flyer

APRIL 1973

MILITARY AIRLIFT COMMAND
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For Greater Efficiency
in MAC Air Operations

The MAC Flyer

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APRIL 1973 MAC RP 127-5 VOL XX, NO. 4

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COVER: It's spring — the light plane flying season is here! Civil aircraft photos furnished by Meisinger Beechcraft Sales, St. Louis, Mo., and Walston Aviation, East Alton, Ill.

The MAC Flyer is published by the Safety Division, HQ MAC. The contents are informative and not regulatory or directive. All names in accident stories are fictitious and no information concerning aircraft accidents may be construed as incriminating under Article 31, UCMJ.
Contributions, comments, and criticisms are welcome. Write: The Editor, The MAC Flyer, MAC/IGYE, Scott AFB, IL 62225, or call: (618) 256-3534, Autovon 638-3534. The Editor reserves the right to change manuscripts to improve them or correct technical errors.
The magazine is available from: The Superintendent of Documents, Government Printing Office, Washington, DC 20402. Price: 20 cents per copy, $2.00 per year ($2.50 foreign).
Distribution F, X; OPR MAC/IGYE.

Squawk Box

Well, it's April — the month when folks in northern areas finally believe winter is over. Lots of changes are associated with April — more daylight, warmer weather, zaniness, green things, spring fever.

April also brings a change to your friendly fly safe rag, but this change won't be cheerful. Starting April First, we can no longer afford to be humorous in The MAC Flyer.

Over the years we've used humor often — and we've had some high spots. Remember the "Analyzer" showing the four anthropomorphic dummies, with the line about navigators? Then there was last April's bit lampooning how women were taking over MAC. Other samples: C. R. Terror getting drunk and disorderly — the terrible Tom Swifties — Fanny Flyer and the Un-crewman — the caricature of a fly doc in March — and the "Married Men Are the Safest Crewmembers" bit. But we suddenly realized that more and more of you readers were taking these spoofs personally, and we knew that this should not be. From now on, we'll try to be serious and somber.

While this new policy may put us in the same class with other charming publications you're exposed to — the Daily Bulletin, safety manuals, and the maintenance instructions for your Seiko, for example — we're confident that the deathless quality of our prose will offset the loss.

Now, in the spirit of April First, we announce with due satirical sincerity our new policy of no more humor. And if you believe all this, we've got some nice uranium stock you can buy for a song.

An ace weather forecaster drafts C. R. Terror to help him review...

The Forgotten Lexicon of Summer Afternoons

by Capt Bob Wachtman, HQ, Air Weather Service

The forgotten what?

"Lexicon. L-e-x-i-c-o-n."

Isn't that an Irish pigmy?

"Sorry, C. R. The dictionary defines *lexicon* as the list or vocabulary of words belonging to a particular subject, field, or class."

Roger, roger. But, uh . . . of summer afternoons?

"Sure. You know, words like ice cream, ball games, bikinis, patio parties, thunderstorms, squall lines, hail, tor—"

Stop right there, Stormy! I perceive an attempt to cleverly disguise the old annual refresher on spring and summer weather hazards, right?

"Okay, I admit it. But I was hoping you could help me out, C. R. You've been through it all at one time or another, and I've heard that quite a sampling of your fellow winged wagon drivers in MAC have had some close calls within the past year. I think your comments would help get the message across."

Well, since you put it that way, Stormy, I'll do what I can. You're right about those close calls — must have been 15 or 20 of 'em last year alone. You go ahead and start your pitch, and leave it to the Daring Deluge Dodger to fill in the action shots. By the way, this won't take long, will it?"

"Nope."

* * *

As the rigors of winter give way to that first hint of spring, even a grizzled veteran like C. R. Terror tends to become a bit euphoric, and his harrowing weather encounters of summers past may fade into oblivion as he bores into a cloudless morning sky. Old Stormy, too, just recovering from a lingering case of cabin fever and the bruises of a few visibility forecasts gone awry, is inclined to face the impending reprieve with the unsuspecting eyes of a Pollyanna. Perhaps a recap of summer weather phenomena will cause C. R. to recall some recent, real life weather encounters within his astute command and, if my hunch is right, the oft forgotten

lexicon of summer afternoons will once again be foremost in our minds. May I have the first slide, please.

Thunderstorm
Ah, yes, the basic element of nearly all violent summer weather. Awesome, majestic, and fascinating to behold . . . at a safe distance, of course.

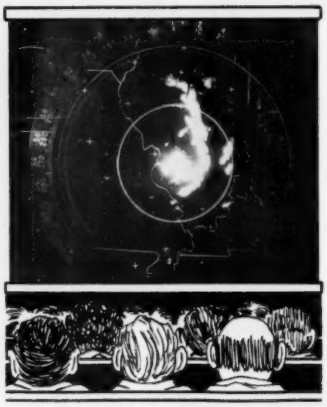
You should approach your flight planning with two thoughts in mind. First, the weatherman is pretty good at determining, well in advance, areas of potential thunderstorm development, and the probable intensity and coverage of the storms. For this reason, the Military Weather Advisory produced at the Air Force Global Weather Central (AFGWC) is one of the most valuable planning aids available to you. You should *always* consult the forecaster on this product during your weather briefings if you're flying in the CONUS.

Second, the forecaster is *not* capable of pinpointing, during the planning stages, the exact location or time of thunderstorm occurrences relative to your flight. But in most parts of the country he can keep fairly good minute-by-minute tabs on thunderstorm activity and come up with reliable short-range (1 - 2-hour) forecasts. Consequently, you will want to avail yourself of all the in-flight updates you can get, especially when you remember that thunderstorm situations vary tremendously.

In addition to info obtained from flight service stations and ARTCC, take advantage of the pilot-to-forecaster (PFSV) stations along your route. But a word of caution: some PFSV stations are no longer manned continuously by forecasters. Instead, a weather observer, identifying himself as such, will be standing by to help you. You should know that his assistance is limited to relaying weather data *without interpretation.*

A final point here: your pilot reports are one of the best sources of weather information, and observers manning the PFSV can and will get your PIREPs into the system for others to use. Give them the same fine support you have given forecasters in the past.

Here we'll return to our lexicon. Next slide.



Squall Line
Also called an instability line, this phenomenon is the usual breeding ground of severe thunderstorms, or, as far as the pilot is concerned, those which are even worse than awful.

Fortunately, the squall line often looks as bad as it is, and will cause a wise pilot to search elsewhere for airspace, even if it means a one-eighty. If continuation on course *is* seriously considered, remember the following points and allow for an escape. Squall line activity changes very rapidly. If you are approaching a line of storms which is moving toward you, expect individual cells to cross your heading from left to right with new cells forming in advance of mature CBs. This can happen in a matter of a few minutes.

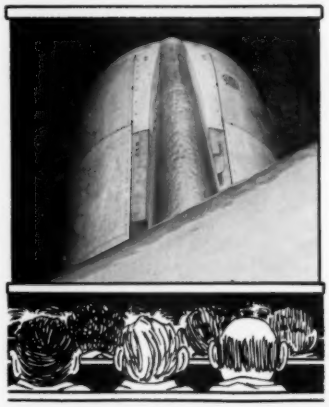
"Does experience bear me out, C. R.?"

It certainly does. One of our MAC marauders tangled with a line of mild showers (he thought) way back in February last year. The heaviest echoes didn't appear too bad, and were five to ten miles apart. But as he started through his radar failed and things got hot in a hurry. For three long minutes he contended with everything from moderate turbulence to heavy precip and St. Elmo's fire. Then he broke out, quit, and diverted.

If you are catching up to a line of storms, the situation is reversed; be on guard for another problem . . .

Embedded Thunderstorm
Like a snake in tall grass, developing thunderstorms may be concealed by stratiform or layered clouds, or by the chaotic skies in the wake of previous storms.

Because widespread precipitation associated with decaying thunderstorms or with slow moving frontal systems, radar echo signatures may be congested, making identification of active cells difficult. This situation offers the greatest degree of uncertainty and is therefore one of the most hazardous. Decisions are difficult, and wrong ones are often recognized too late. Click.



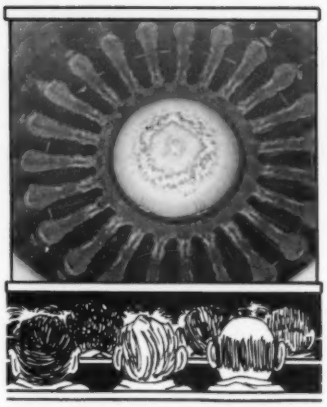
Hail

A good pilot, like an experienced golfer, knows that, in the vertical "driving range" of a thunderstorm, hooks and slices are common. Don't expect everything to stay on the fairway.

As I'm sure C. R. can verify, nearly every hail encounter comes as an unpleasant surprise to the unsuspecting aviator. Just as he is priding himself at having squeaked by (or over) a giant thunderbumper, he gets the Gatling cannon treatment and is all but disassembled in flight. It's good to stay well clear of harmless looking cirrus clouds in the vicinity of thunderstorms and, once in the clear, to avoid the storm altogether by several miles or more. Hail has been encountered below and *above* the CB anvils, and at least ten miles away from active cells.

"Right, C. R.?"

Ten miles? I guess! Another of my able colleagues bored into some cirrus — late in June, I think it was — with a perfectly healthy radar tuned to the 50-mile range. Even before he had a chance to find any echoes, he received a 15-second barrage of hail. When he did locate the culprits on his scope, he said none appeared closer than 25 miles. Well, that may be stretching it a bit, but the fact is: the hail came as a complete surprise. Dinged his radome and all engine pylons, too.



Turbulence and Icing

Though probably the least forgotten, they warrant strong emphasis.

All pilots know that the term "severe turbulence" and "severe icing" are briefed free of charge with every mention of thunderstorms. Some pilots consider this convention a "cry wolf" tactic, but most agree they have yet to see the thunderstorm that they would deliberately fly through. As is the case with hail, turbulence of the higher orders is found near, as well as in, thunderstorms of all shapes and sizes, and icing of one form or another is likely in clouds. Avoidance by several miles is again the safest course.

You're right, Stormy. We know our limitations, slight as they may be. None of us got bounced more than moderately near thunderstorms last year, although there was one close call. That was the one I mentioned with your pitch on squall lines.

Lightning

A menace, but the odds are against serious impact.

The complexity of electric fields in areas of convective activity poses an ever-present threat of lightning

strikes. Chances of extensive damage are slight, but electrical malfunctions are not uncommon. Again the universal rule applies: the greater the distance from active thunderstorms, the less your chances of trouble. But don't rule out the possibility of a lightning strike or static discharge affecting your machine many miles from the nearest CB, especially if you are driving a C-5.

The danger of getting a lightning strike while parked on the ramp warrants separate mention. This is where people may easily find themselves between the dog and the lamppost! With today's tail sections all but daring nature to try them on for size, it is the bystander, not the airplane, who is in for a short career. People tend to regard too carelessly the fact that lightning is the thunderstorm's greatest killer.

Last slide, please.

Wait a minute, Stormy. I have plenty to say on lightning strikes — they made believers out of a dozen of us last year. A few weren't noticed until it was all over, but most were nothing short of spectacular. And at least half occurred far from any visible signs of thunderstorm activity. One of the bolts caught a Starlifter crew off guard in light rain at 13,000 feet. The guys in the back usually miss all the fireworks, but not this time. For a tense moment there, they shared the cargo compartment with the brightest fireball you ever saw.

You're not kidding about the ground strikes, either. My bird's T-tail attracted a bolt down at Kelly last summer and tore up the electrical system and a ground power unit pretty bad. I'm glad I was in the snack bar gumming a banana at the time.

The Tornado

The pilot may question my appreciation of his integrity. After all, if he isn't going to deliberately fly into a thunderstorm, he certainly isn't going to take on its most violent offspring.

You have all seen pictures of tornadoes; many of you perhaps have witnessed one first hand. Ask yourself this question: Do you think all that fury suddenly stops at the top of the funnel cloud? Not likely. The driving force behind the tornado is a severe thunderstorm, characterized by a strong, rotating updraft, and located some distance away from the tornado itself. Evidence strongly suggests that the link between the funnel cloud and the "mother storm" is a long, rope-like appendage referred to as a vortex aloft, similar in violent motion to the visible tornado itself. These vortices aloft may exist horizontally without reaching the ground, and, horror of horrors, they are usually concealed in clouds but *outside* the area of strongest radar returns. Knowledge of this phenomenon may well haunt the pilot who is about to aim his craft "between two strong echoes." Unfortunately, studies of this phenomenon are incomplete; however, the evidence is well worth passing on just the same.

Well, C. R., that about does it as far as the forgotten lexicon of summer afternoons is concerned — realizing, of course, that afternoons certainly do not have exclusive rights to all this bad weather. By the way, thanks for filling in some attention-getting experiences and statistics.

Glad to help, Storm. There are a few other words in my summer lexicon but I . . .

Yeah, we'd best skip that.

There is one more term to mention, though. It's not a forgotten term; in fact, it's a new one: *ROS closure.* As part of the drawdown, Air Weather Service has been forced to discontinue use of its Representative Observation Sites (ROSs). The observer will be moving into the base weather station where he will assume other duties in addition to keeping tabs on airfield weather. In short, he will be making fewer observations and from a less suitable vantage point. This may well cause the pilot some concern, since thunderstorm weather is characterized by extremely localized and rapidly changing conditions in the vicinity of an airfield. Pilots should be alert to this change in service when requesting current weather at destination and alternates. Additional detail and updates should be requested from tower or RAPCON personnel prior to landing if you suspect you aren't getting the whole story from the latest sequence. ROS closures will be occurring throughout the summer and all CONUS ROSs will be deactivated by the end of 1973.

Okay, any questions?

Thanks, Stormy. You gave us more than one good word for summer.

Global Notes

award winners

Congratulations to all units and personnel chosen to receive MAC safety awards for 1972. Flight safety winners were:

MAC Safety Officer of the Year
Capt Joseph A. Panza, Jr.
375th Aeromed Alft Wg

MAC Safety NCO of the Year
SMSgt John R. Flynn
89th Mil Alft Wg

The MAC Trophy
Twenty-second Air Force

Special Award for Flight Safety
436th Mil Alft Wg, Dover AFB

MAC Flight Safety Achievement Award
89th Mil Alft Wg, Andrews AFB
375th Aeromed Alft Wg, Scott AFB
443d Mil Alft Wg, Altus AFB
40th Aerosp Resc & Recovy Wg, Ramstein AB
60th Mil Alft Wg, Travis AFB
62d Mil Alft Wg, McChord AFB
63d Mil Alft Wg, Norton AFB
436th Mil Alft Wg, Dover AFB
437th Mil Alft Wg, Charleston AFB
438th Mil Alft Wg, McGuire AFB

MAC Support Safety Achievement Award
604th Mil Alft Spt Sq, Clark AB

Twenty-Year Accident-Free Award
76th Aerosp Resc & Recovy Sq, Hickam AFB
76th Mil Alft Sq, Charleston AFB

Our last post-emergency, press-on prang revisited.

Mishap with a Moral:

The Accident After the Accident

It was late at night when the giant commercial airliner crashed in the swamps of the Everglades. A cry for help went out, and men and helicopters from MAC's Aerospace Rescue and Recovery Service were quick to respond. Shuttling back and forth throughout the night and into the morning, rescue crews airlifted survivors from the swamp to nearby civilian hospitals. Their actions made the difference between life and death for many.

The Everglades operation is a good example of the challenges which rescue crews face as they respond to a major disaster. First, they must find the crash scene in a remote area, then establish operations — typically after dark, plan routes to the nearest hospital, move the injured there as rapidly as possible, and keep returning for another load as long as the need exists. Speed is important; to have someone survive the crash only to expire while waiting for transportation is obviously bad news. But too much speed — expediting your way into an accident — is also bad news.

In a climate of dead and dying people, great urgency, unfamiliar areas, and "damn the torpedoes" aggressiveness, there's an excellent chance for a chopper to get bashed. Fortunately, we haven't had such a mishap in a long time — in fact, it's almost been long enough for us to forget the painful lesson. To refresh our memories — and to head off the next accident — here's the story of our last press-on prang.

* * *

The mission began when an F-4 crashed on a gunnery range. Both Phantom crewmembers ejected successfully but were severely injured. The alert helicopter at the range immediately picked up the injured men and delivered them to a nearby civilian hospital.

Later that morning the second helicopter crew was alerted for another mission. They were instructed to drop off a flight surgeon and medical technician at the hospital and then take the wing commander to the accident site. The chopper crew picked up the passengers, flew to the hospital and, after the auto traffic was stopped, landed on a designated median-divided U. S. highway adjacent to the hospital.

After the flight surgeon and medical technician got off, the chopper flew on to the crash site. Later, the flight surgeon contacted the commander and asked that a neurosurgeon and additional medical equipment be flown in from another nearby hospital.

The second crew left the crash site, picked up the neurosurgeon and equipment, and then headed toward the hospital. Shortly after takeoff, the aircraft commander again

asked the local sheriff to stop the traffic on the highway. As soon as this was done, the pilot made his approach and landed on the busy highway.

The pilot, concerned about the critical condition of the injured crewmembers, began taxiing toward the emergency entrance of the hospital. He taxied under one set of wires without incident, stopped under another lower set, and quickly offloaded the passengers and equipment. Then the pilot started to ground taxi to a clear area for takeoff. As the aircraft rolled forward, the engineer was monitoring the cables on the right side while the copilot watched the left. (Remember, copilot position is on the left side of a helicopter.) As the center of the copter passed beneath the wires, the rotor blades severed the wires and then struck a parked automobile. The crew encountered severe uncontrollable oscillations and extreme vibrations, making it difficult to shut down the engine. After separation of the tail assembly and moderate damage to the fuselage, the pilots were able to shut down the engine and evacuate their crippled chopper.

* * *

The accident board thoroughly investigated this mishap and found many startling facts. The primary cause was operator factor because the pilot in command taxied the helicopter without proper clearance. The board also named supervisory factor, inadequate crew coordination, poor selection of landing area, violation of operating instructions and taxi directives, and even the cockpit canopy distortion as contributors. Each of these contributing causes played a significant part in the sequence, making the accident inevitable.

The detachment commander, acting as the copilot, brought the overhead wires to the pilot's attention, but *assumed* the pilot would take the proper action. The detachment operations officer, who was the aircraft commander in this case, observed the wires personally but *assumed* the blades would clear. The flight engineer was aware of the marginal rotor blade clearance, but *didn't take the time* to tell the pilot just how close it really was.

Any crewmember acting aggressively could have prevented this mishap; however, everyone *assumed* proper action would be taken or that the rotor blades would clear the wires.

Without doubt, the crew was highly motivated and dedicated to an expeditious and successful mission, but once the doctor and equipment were delivered to the hospital, the "life and death" urgency was no longer required.

A complicated optical apparatus, properly described and understood, is a must for...

Seeing What You Are Looking For

by Maj Bob Gardner

How do you avoid a mid-air collision? Simple — by not trying to share a piece of sky with another aircraft. And how do you keep clear of other aircraft? Two choices: Either receive spacing through procedural or radar techniques, or *see the other guy and avoid hitting him.*

Obviously, your last — and best — avoidance mechanism is the human eye. But your eye, unique mechanism that it is, has some peculiarities which you need to know about if you want to do a top-notch job of seeing. The items may be physiological, psychological, or mechanical — no matter; if you aren't seeing well, the result could be the same: disaster.

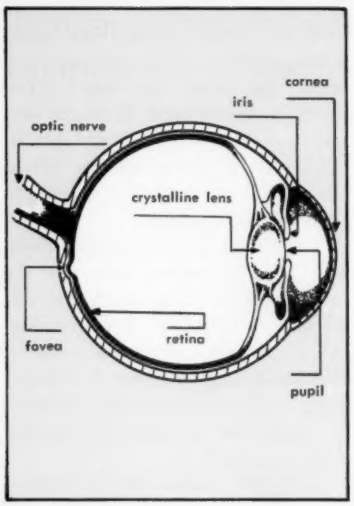
Here are some of the more important reasons for nonseeing in a sight-possible environment: cockpit preoccupation, fatigue, glare, high altitude effects, workload, fixation, contrast, light levels, acceleration, and aircraft structures. Unfortunately, we have little control over many of these external situations. But the internal situations — how we use our eyes or how our eyes use us — we *can* control to some degree, and these are the points we'll consider.

Parts

Let's look at this sense organ which provides the raw data for visual perception — the human eye — and explore some of its limitations. By understanding better our visual apparatus and knowing a few compensating techniques, we can enhance the reliability of our own collision avoidance system.

The eye is a globular-shaped organ that transfers light energy into nerve stimuli which are transferred to the brain. Light rays are deflected when they pass through the transparent outer covering, the *cornea*, into the small eliptical crystalline *lens*. The lens focuses the rays onto the *retina*, the inner membrane lining the rear two-thirds of the eyeball, where the nerve endings are located. Here light becomes electrical energy, and signals are conveyed to the brain via the optic nerve.

The real light sensitive detectors are the two distinct photo-sensitive cells of vision, the *rods* and *cones*. The cones function best in bright light and allow us to see color and detail. They are more densely packed in the central region of the eye and



Cross section of the eye.

are concentrated on the *fovea,* which is a pinhead size depression at the rear of the retina. The rods, which are the black and white receptors, are scattered all over the retina except at the fovea. They function in the dark and at low illumination levels.

Because it contains nothing but cones, the fovea is the center of acute vision. This is good news in daylight but if the eye is looking directly at a small dim object at night (when the cone vision in the fovea is not functioning) the object will not be seen. This is a fairly simple problem to overcome. Just look a few degrees to one side of the object, so that the light impulses reach the rods, and you can see the object clearly. Looking past the object may also help; this will give you more detail.

Space Myopia

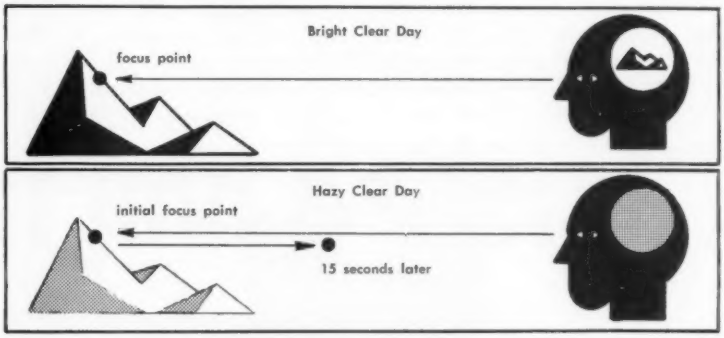
Pilots often experience a special kind of nearsightedness or *myopia* at altitude without realizing it. This occurs when we don't have anything beyond the cockpit to focus on or when distant references are not sharply outlined against the horizon. Two examples would be on clear days when there is really nothing to see except blue sky or in hazy conditions where indistinct backgrounds exist.

In hazy conditions color and contrast are subdued and the eye's ability to maintain a distance focus is weakened. After a short lapse of time the focus tends to recede back toward the viewer. Under such circumstances the eye also has difficulty holding a focus greater than one mile. And the more hazy the background, the greater the tendency of the focus to recede. Here's where scanning requires special pilot effort, and shifting the glance frequently from instrument panel to wing tip to distant object (if available) will help.

Don't despair. There is a solution. Fortunately, it only takes about one-fifth of a second for the eyes to refocus for distance. So pick a distant object: a cloud, a contrail, a point on the horizon, or even a wing tip, and consciously focus on it, then look for your target.

Blind Spot

All of us have a built-in eye defect known as a blind spot. There's a small blank region within the field of vision of each eye, 45 degrees from center, where the optic nerve exits the eyeball on the way to the brain. "Ah, that's not so, I sure don't have any blind spots," you say. Sorry about that; each of your eyes *does*



When the eye fails to find a distant point to focus on, it tends to tire and relax. This relaxation causes the focal point to move back toward the eye, making you nearsighted.

If we stare at the open sky and do not consciously focus on a distant point, our eyes will relax and tend to seek a focal point 30-35 feet away. If your eyes are pre-set to see clear and sharp at 35 feet, it is hard to pick out another aircraft at four to seven miles. Your effective sighting distance will be greatly reduced and small targets may escape your attention. With the rapid closing speeds of modern airplanes, it is pretty easy to understand why this phenomenon increases the danger of "underlooking" an aircraft on a converging and collision course.

have a blind spot just like everyone else's, but like most people you're unaware of the area of blindness because of binocular vision. That's because the left eye can see objects in the blind spot of the right eye and the right eye can see objects in the blind spot of the left eye. Thanks to the overlap, we are not aware of any loss of vision. But when something obscures the vision of one eye, then the blind spot of the other eye becomes a factor. It isn't very significant at close range since the circle of blindness is only a half inch in diameter at eight to nine inches. But

the farther away the object is, the larger your blind spot is and the greater the possibility that you can't see the object. At 200 feet the circle of blankness becomes six feet in diameter — big enough to hide an approaching motorcycle—and at 3000 feet you can fail to see a good-sized airplane.

What might block one eye? The bridge of your nose, the frame of your sunglasses, a cockpit windshield post — any number of things. All it takes is a visual obstacle which interrupts a few degrees of your visual range for one eye and you may be operating with a blind spot. This is one of the reasons why you never see a one-eyed pilot.

Again, there is a rather simple way to compensate for this limitation. The answer is to consciously turn your head or move your eyes to cover that area which was blocked by the blind spot. In most cases, this will eliminate the problem of the blind spot by allowing both eyes to focus on an object. That way one eye covers the blind spot of the other.

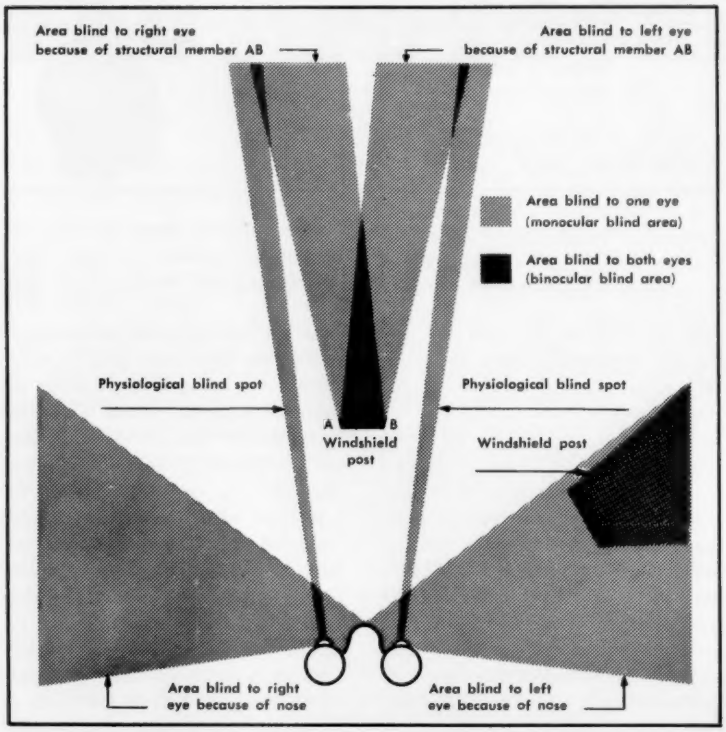
Scanning

Now that we've learned a couple of techniques that will help overcome some of the limiting factors of the eyes, let's see if we can use our visual receptors more effectively. Many times we sweep our eyes back and forth across the sky, looking for some movement which will get our attention. There are a couple of misconceptions with this type of scanning. First, the eye does not perceive detail well when it is moving. Consequently, your chances of seeing another airplane while visually skimming really aren't very good. A better method is to pick an area and stop your eye movement. Anything with relative motion will stand out.

The best way is to search in quadrants — preferably 45 degrees at a time. Pick a sector — gear your eyes for distant vision, then spend a couple of seconds thoroughly covering that area. All clear? Then move on to the next 45-degree segment. In this way you will be attracted to anything moving across the small sector and also be able to perceive small targets.

This brings us to the second problem, that of looking only for the moving target. A moving target will be easiest to see because it attracts our attention, but as long as it moves, it is *not* a collision threat. You aren't going to hit anything that continues to move from the spot where it was first observed.

But what about the stationary target? Here's the snake in the grass. First, a target with no apparent motion is going to be doubly hard to see. Secondly, this is the airplane that is on a *collision course* with you unless you are flying on parallel courses. Once you detect a stationary target, try to keep it in sight. The fighter pilot's rule of always keeping the enemy in sight applies pretty well in collision avoidance, too.

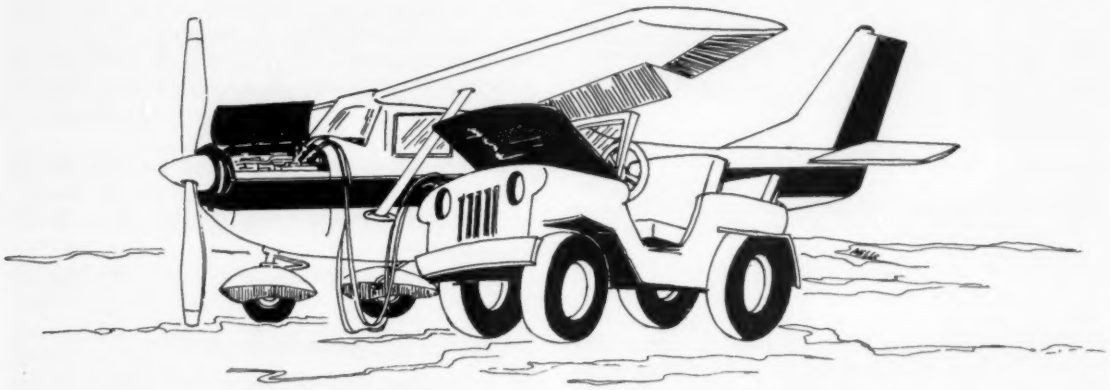

Area blind to right eye because of structural member AB
Area blind to left eye because of structural member AB
Area blind to one eye (monocular blind area)
Area blind to both eyes (binocular blind area)
Physiological blind spot
Physiological blind spot
A
B
Windshield post
Windshield post
Area blind to right eye because of nose
Area blind to left eye because of nose

Summary

While there are no fail safe procedures to follow to avoid mid-air collisions, our own eyes are the best preventive devices we have — even with their limitations. If you are aware of the implications of rod and cone distribution, space myopia, blind spot, and scanning problems, you'll be better able to use your eyes to see what you're looking for as you search for other airplanes. Another thought: the more eyes searching the better, so put the eyes of your copilot, engineer, or anyone else to work also.

By properly using our eyes, plus capitalizing on the terminal radar facilities discussed on page 16 and applying the procedures outlined last month in "The Ultimate in Air Pollution," your risk of having a mid-air can be greatly reduced.

Jumper cables and a cooperative friend may be the answer when your car runs out of electricity, but that's no answer when your bird quits.



A Short and Battery

The pilot was a bit late in arriving at the airport to pick up his rental Mooney. With the short winter day it meant that the last half of his trip would be in darkness. Well, no matter — he had flown the route several times and there were many visual and electronic navaids en route. The batteries in his flashlight were a bit weak and there were no fresh ones for sale at the airport. No problem; the aircraft was well maintained and equipped, and he had flown it several times before.

An hour after takeoff, it got dark in the cockpit and he turned on the panel lights. Another 30 minutes and number one VOR indicator became erratic, then 10 minutes later number two showed the "off" flag. Even with the panel light turned up full, the instruments were difficult to read; his flashlight was also growing dim and occasionally blacking out. He noted that the well-traveled highway below him was occasionally blotted out; the last weather he had picked up indicated scattered clouds in the area. He bled off some altitude to get below the cloud deck and frightened himself by flying into a big buildup and momentarily losing all visual reference.

He called the nearest FSS — no answer. He switched to emergency frequency and called again — no answer. He decided to land at the closest airport — if he could just find it. He turned off all his electrical equipment and put the gear switch in the "down" position: no change in trim — the gear must still be up. He sighted the airport beacon, overflew the runway, and chose runway one-three by the lighted tetrahedron. He used the manual gear-extension crank — it jammed against something. He wound it back and tried it again — it jammed again. There was an owner's handbook

A Short and Battery

in the glove box but no light to read by. He lined up with the 6,000-foot runway, with gear up, flaps up, and no light to read the airspeed and altimeter. He set up an approach that, it soon became obvious, was too fast.

The Mooney flew almost the entire length of the 6,000-foot runway before touching down near the base of the tower. It slid along one side of the runway and wiped out a runway light. The defunct runway light blew the entire string, and the pilot deplaned in complete darkness. The tower operators — with no idea of what happened — suspected a short circuit and were feverishly searching for a way to get the lights back on when they heard a knock on the tower door. They opened it to a sheepish and somewhat frightened pilot:

"I just had an accident."

"Are you on the runway?"

"Hoo, boy! . . am I on the runway!"

* * *

In an effort to keep you out of total darkness such as our Mooney friend experienced, we present an adapted Flight Safety Foundation article discussing battery power and airplane electrical systems.

* * *

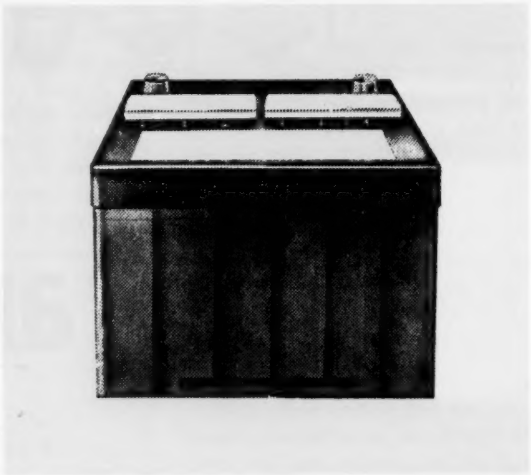
In modern day flight, a heavy power drain is imposed by sophisticated electronics and auxiliary systems, and each pilot must know the capabilities and limitations of his aircraft. He must include subsystems monitoring in the overall systems management of his aircraft.

Recently, a highly respected and highly decorated test pilot said, "The most important instrument on your instrument panel is the ammeter!" He went on to explain that the modern airplane is completely dependent upon continuous electrical power and that the battery is little more than a "condenser" on the line. If the normal output is not being supplied at all times from the generating source, a critical power shortage can develop within an hour or less. "Unfortunately," he said, "the ammeter is usually tucked away in an obscure point and is rarely checked by a pilot."

Engine ignition, still an independent system as in the earliest days of flight, depends on the magnetos for energizing the spark plugs, but the list of equipment that operates directly from the aircraft electrical system is as long as your arm.

In addition to lights, the list may include radios, landing gear, transponders, starter motor, navigational and engine instruments, deicing gear, cabin heat, flaps, autopilot, fuel pump, heated pitot mast, etc. Our acknowledged dependence on electrical equipment makes it the business of every pilot to understand what may go wrong in the electrical system in flight, and what he may do about it to ensure a safe landing.

Most single-engine aircraft use an ordinary 12-volt lead/acid wet cell battery, similar to the one used in automobiles. Twins usually use a 24-volt



battery, or a hook-up of two 12-volt units. These batteries need no special care, other than periodic checks for water level and possible leaks. The state of charge is measured either with a squeeze-bulb hydrometer which tests the density of the electrolyte, or by a voltage meter under load.

Normally, the battery is used only to start the engine, which then takes over the task of supplying all necessary electricity. After this, the battery "floats" at full charge as a standby source of emergency power. The current required is drawn from the generator, or alternator, which is controlled by the voltage regulator. If the latter breaks down, or "sticks," insufficient power may be generated, at which point current will start to flow from the battery. A short in the electrical system could also result in power being drawn from the battery, by

creating an excessive demand upon the generator.

As a source of standby power the battery has a limited lifespan, depending upon the load placed upon it and battery capacity. For example, a 30-amp battery at full charge will put out approximately 30 amps for one hour, or 15 amps for two hours, or 10 amps for three hours, etc.

As with automobiles, aircraft are now being equipped with alternators in place of generators. While either will supply alternating current which is converted to direct current, the alternator is lighter and capable of putting out more power at lower rpm.

Most battery-equipped aircraft have an ammeter on the instrument panel. The information provided by this instrument is not always correctly interpreted. The instrument may be wired in several ways. One type common to the older or smaller aircraft simply shows the rate at which the battery is being charged or discharged. When electrical power is being supplied by the battery, the ammeter needle is deflected to the left. When the needle moves to the right of center, it shows the rate at which the battery is being charged by the generator (or alternator). Some aircraft simply use a warning light which flashes on to show when the generator is not operating or is malfunctioning.

Under normal circumstances the needle type of ammeter will show a slight discharge (−) when the master switch is turned on, a strong discharge when battery power is cranking the engine, and a strong charge (+) while the engine is revving up. In flight the needle will be centered or slightly on charge. Continued readings of heavy charge or discharge spell trouble: there may be a short in some electrical unit, or a malfunction of the battery, regulator, or generator.

Modern, more sophisticated aircraft may employ an ammeter wired to show the power load produced by the generator. The instrument will read from zero to maximum output. It also will show a strong charge immediately after startup, and thereafter a charge equivalent to the electrical power needs of the aircraft. If the pilot knows the normal in-flight draw is 15 amps, and he observes a continued reading distinctly higher (or an unwarranted fluctuation), he must suspect a malfunction in the system.

None of the panel instruments indicates the absolute state of charge of the battery — this cannot be determined in flight, except as indicated by failing power when the generator has cut out.

The pilot who receives a warning of electrical trouble in flight should isolate the problem, if it is not in the power supply system itself, by turning off all electrically supplied elements and individually turning them back on, observing any effect upon the ammeter. A sharp jump in the

charging rate may indicate a short circuit; no charge means an open circuit (non-functioning element). If the warning light goes out and remains out, or if the load demand is reduced to normal, the pilot may assume he has isolated the problem, but he should have his electrical system checked by a mechanic at the first opportunity.

Obviously, the better the condition of the battery, the greater standby power it will provide. Therefore it behooves you to frequently check and service it. Unfortunately, the majority of aircraft batteries are not conveniently located.

No matter what you fly, it's for your own benefit and safety to make sure your aircraft's battery(s) is in good condition and fully charged.

A thorough knowledge of your aircraft's electrical system plus monitoring the ammeter and taking immediate action to isolate an electrical problem will certainly help keep you out of trouble.

A final item that is often overlooked but has saved many lives is a good flashlight — with good batteries. The next time you go flying beware of bad batteries.

Here's a report on the newest plan for a safe intermix of VFR and IFR traffic.

The Three Stages of TRSA

by Capt Phil Budd

Whaddeya mean I can't take off on a VFR local without contacting departure control? I'm not filing IFR — just a VFR local to do some air work! I don't want to bother with ATC, and I'm sure they don't want to bother with me. They have enough headaches without **me** to worry about."

"But, sir, if you're filing VFR into a Stage III VFR Terminal Radar Service Area (TRSA), you **have** to contact air traffic control. It's mandatory!"

"Stage III? VFR Terminal Radar Service Area? Mandatory program? What are you talking about?"

Although these utterances probably wouldn't be made by a MAC crewmember (because we're such professionals), there does appear to be a lack of knowledge about services provided by VFR TRSAs. The days of flying on totally visual rules are just about over for blue suiters. FAA, in the past year, activated some 20 Stage III VFR Terminal Radar Service Areas, and all Air Force pilots are required to participate in the program. TRSA is available in three categories: Stage I, II, and III, with Stage III, briefly mentioned above, being an expansion of the other two types.

If you'll hang in here with us, we'll discuss Stages I, II, and III, and the benefits we as pilots will derive from using these VFR radar services.

STAGE I

Stage I radar is an advisory service provided for VFR pilots. To use this service (or Stages II or III), the only equipment you need is a two-way radio in your airplane to communicate with ATC. Here's how you go about using Stage I. If you are arriving at a terminal where it is provided (check the IFR Supplement for availability and frequency), call approach control and give the controller your position, altitude, SIF code (if transponder equipped), and destination. Provided the controller is not swamped, he will give you the winds, active runway, and time and place where you should contact the tower. (The winds and runway information can also be obtained by listening to ATIS when available.) If ATIS is available and you tell the controller that you have the numbers, he will delete the winds and runway info. You may request vectors or the controller may offer them if you concur. Depending on the controller's workload, he will also provide traffic advisories. When the controller tells you to contact the tower, all radar services are automatically terminated.

Remember, this entire service hinges on the controller's radar limitations, volume of traffic,

communications frequency congestion, and the controller's workload. The controller has the complete say so on whether or not he can provide you with Stage I service. If he decides he cannot or if he terminates your service before turning you over to tower, you will not question his decision.

This is the essence of Stage I service: it's an advisory service that you as a VFR pilot are invited to use. You need a two-way radio, and it's the controller's decision whether or not he can provide the service. It is a good service and can help you plan a better approach and landing. You should use it whenever you can.

Photos by Sgt. Bill Talley

STAGE II

Out of Stage I grew Stage II, which is an advisory service plus a sequencing service. Stage II, like Stage I, is not a mandatory program but you are urged to use it. The purpose of Stage II is to adjust the flow of arriving VFR and IFR aircraft into the traffic pattern, in an orderly manner.

To receive this service, first check the IFR Supplement and determine that it's available for the terminal area you will be using. And, of course, you'll need a two-way radio. If Stage II is available, use the frequencies listed and contact approach control when you reach the boundary of the service area (the boundary can be found in the IFR Supplement). On initial contact, tell the controller you are requesting radar service. If ATIS is available, tell him you have the information; otherwise he will give you landing information and needlessly tie up the radio. Participating in Stage II service will provide you with a route to the traffic pattern and any other information needed for your sequencing into the pattern.

After the controller gets a positive ID, he will vector you to the pattern or sequence you in with the traffic. Like Stage I, when the controller turns you over to tower, radar service is automatically terminated. The tower controller, on initial contact, will give you your position in the landing sequence.

"Okay, this is all fine and dandy — but you've only told me the arrival procedures. How about if I'm departing — does the Stage II service work both ways?"

The answer is yes, and the procedures are just as simple as when you arrived. All you need to do on initial contact with ground control is to tell them that you want radar service and advise the controller of your proposed route or direction of flight. The ground controller will then alert the tower controller. Prior to takeoff, you will be given a frequency and instructions on when and where to contact departure control.

Stage II also provides you traffic information on a controller-workload-permitting basis if you're passing through the area. If you desire this service, look up the frequencies in the Supplement and contact the controller, telling him that you are requesting traffic information. You must also give him your position, altitude, radar squawk, destination, and route of flight.

A quick recap may be in order at this time. Stages I and II are not mandatory, but all pilots are urged to use them when available. Both stages provide advisory information; Stage II also provides sequencing service. Both stages are for VFR aircraft, and it remains the pilot's responsibility to avoid other aircraft. Further, you must not allow yourself to be vectored into IFR conditions or break a regulation just because you are on a vector; it's up to you to advise the controller if this will happen.

STAGE III

"Stages I and II are a big help to us, but if FAA could come up with a true radar controlled environment for VFR aircraft in heavy traffic areas there would be less chance for a mid-air."

FAA already **has** such an environment. It's Stage III, and its

use is mandatory for USAF aircraft. As mentioned in the first part of this article, Stage III is something new in the last year. Its purpose is to provide, to the extent possible, radar sequencing and separation for VFR aircraft operating in Terminal Radar Service Areas.

As with the other two stages, you will need to consult the IFR Supplement to see if Stage III service is offered at your departure point and your destination. If it is, copy down the frequencies and tune in ATIS. Normally this broadcast will tell you who to contact for clearance. If ATIS is not available, and you are on the ground, call ground control for instructions. If you're airborne call FSS.

Although Stage III TRSAs are primarily a radar environment, they do not preclude the use of nonradar separation when required. For example, you may be instructed to follow the aircraft two miles in front of you and maintain your own spacing. During VFR weather conditions, the following separation may exist:

1. 500 feet vertical separation may be used between VFR aircraft and/or between VFR and IFR aircraft.

2. Visual separation may be used between arriving VFR aircraft and/or between VFR and IFR aircraft as follows:

a. When a VFR flight is positioned behind the preceding aircraft and the pilot reports having that aircraft in sight, he will be directed to follow it.

b. When IFR flights, operating in VFR conditions, are being sequenced with other traffic and the pilot reports the aircraft he is to follow is in sight, the pilot may be directed to follow it and may be cleared for a visual approach.

c. Upon being told to contact the tower, radar service is automatically terminated. The tower will assign a landing sequence number.

3. Visual separation may be used between departing and arriving VFR aircraft and/or between VFR and IFR aircraft when the pilot sees the other aircraft and reports he will maintain visual separation from it.

Stage III, compared to the other two stages, is essentially IFR service in VFR conditions. Of course, in every system there are those who don't participate, so you will need to keep your head out of the cockpit. The controller will advise you of all traffic that is IFR or participating VFR, and generally report all observed but unidentified traffic. You may request vectors around this traffic if you're within the controller's airspace jurisdiction and the controller's workload allows it.

RECAP

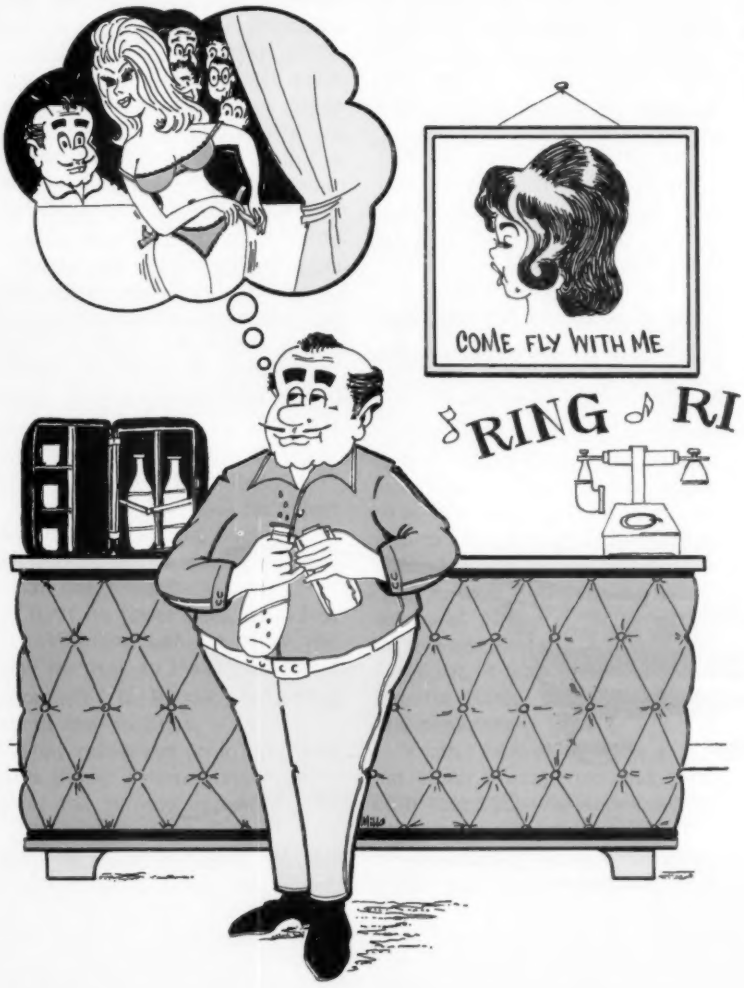
Except for Stage III, which is mandatory for USAF aircraft, use of the TRSAs is purely voluntary. The only special equipment you need is a two-way radio with the capability to communicate with ATC. These services are advisory and do not relieve you of the responsibility of maintaining VFR, nor do they relieve you of the responsibility of maintaining proper clearance from any hard (or soft) surfaces, including other aircraft. For more detailed information, see the FLIP Planning Document or the Airman's Information Manual. If you use Stages I, II, and III regularly, mid-airs—especially in high threat areas — will decrease. We see TRSAs as providing a means for smooth **safe** interface for IFR and VFR traffic.

LOCATIONS OF STAGE III VFR TERMINAL RADAR SERVICE

Eastern Region:	Rocky Mountain Region:
Albany, N.Y.	Denver, Colo.
Baltimore, Md.	
Pittsburgh, Pa.	Southern Region:
Richmond, Va.	Greensboro, N.C.
Rochester, N.Y.	Jacksonville, Fla.
	Macon, Ga.
Central Region:	Montgomery, Ala.
Omaha, Neb.	Nashville, Tenn.
St. Louis, Mo.	Savannah, Ga.
Wichita, Kan.	
	Southwest Region:
Great Lakes Region:	Albuquerque, N. Mex.
Akron-Canton, O.	Houston, Tex.
Cleveland, O.	New Orleans, La.
Detroit, Mich.	Tulsa, Ok.
Pacific Region:	Western Region:
Guam	El Toro, Cal.

For anyone who flies the biggies, aeroclub aviating ought to be a snap.

C.R. TERROR



Dum de dum, dum de dum," hummed the Fat One as he puttered around his padded-front, mahogany-topped wet bar. His portable potable case was opened on the counter, and the gurgling sound of gin being transferred from the bottle to the sterling silver flask was evident.

"Ah, the melodious splashing of this sparkling nectar is music to my ears," he enthused to the empty room. "Tassels, baby, your sugar-daddy is about to pick you up for a weekend you'll not soon forget!"

C. R.'s refueling efforts were interrupted by the ringing of his French phone.

"Hullo, Major Terror speaking. Wars fought, ladies caught, and piloting taught . . . can I help you?"

"It's only me, chief," came the reply. It was Blinky, navigator to the World's Greatest. "Sam and his wife can't make it this weekend, so it looks like just you and me for the flight to the mountains. Are you sure Tassels has a date lined up for me?"

"Ah, Blinky, m'lad. I can personally guarantee that Miss Taylor will provide you with a pulchritudinous young miss who will drive your tender navigator eyeballs smack against the back of your skull—that being, admittedly, a brief trip."

"Outstanding, sir! I guess she'll be an entertainer like Tassels er . . . Miss Taylor?"

"Roger that, son. That lodge has really been packing them in this season," C. R. said, now holding the phone between ear and

shoulder so he could continue restocking his satchel of savory sauces.

"Has the aeroclub approved your taking the Cessna into that little strip up there? I mean, all this is all right, isn't it?"

"Blinky m'boy, have you no faith? Have I ever let you down? Your apprehension cuts me to the quick . . ."

"Oh no, sir," Blinky answered with mock seriousness, "I just didn't want to get in trouble. When do we leave?"

Glancing at his massive day-date-year watch with the moveable bezel, the World's Greatest Aviator replied, "In 13 minutes, you be at the full length of your chain and I'll pick you up."

"Yessir!"

* * *

Exactly 12 minutes and 45 seconds later, the Rotund Romancer's kelly green Datsun 240Z screeched to a halt in front of Blinky's apartment building. Blinky, bag in hand, came out and smiled as he saw C. R. sitting there wearing a shamrock green jump suit, green leather driving gloves, curved sun glasses, and a jaunty beret. His ebony cigarette holder, complete with a gold ring Egyptian Oval, extended from beneath his well-waxed mustache. He was racing the engine and obviously enjoying the resultant throaty growl.

"Time's a wastin' . . . let's be off and slip the surly bonds of earth on oil-cloth covered wings."

"That Cessna has metal-covered wings, chief," Blinky corrected as he slipped into the right seat.

"No difference, m'boy, it's just a toy in either case. When you have as much experience in the heavies as I do, flyin' one of those light planes is like child's play," C. R. said, smiling.

The drive to the Aeroclub was relatively brief and uneventful. As they stowed their gear in the pretty little green and white 172, C. R. gave Blinky the briefing.

"Here's what we'll do. I'll file for a local flight while you check the charts and plot us a course to Mountain View airport. We'll bomb on out there, land, give the girls a call, and refuel. By the time we finish that, they should have arrived at the field and we'll zip on back here. Questions?"

"Isn't that illegal? That airfield is outside the local area and in a mountainous area to boot. Sounds tricky. What if we get caught?"

"I'll take full responsibility, m'lad. Get caught? Caught doing what? Just taking a little sightseeing flight. Look, son, the world is full of ugly frogs and handsome princes. Nothing goes right for the ugly frogs because they're ignorant, misguided, and puffed up with their own importance. Everything falls into place for the handsome princes because they're ahead of the game. They 'understand,' ya see? Can I help it if I'm a handsome prince? Now let's go!"

Forty-five minutes later the Cessna 172, with the Swinging Sultan of Skymanship at the controls, lifted from the air base runway.

"Wheeeee! Look at this kite fly!" chortled C. R., pulling back on the wheel.

"I hope so," Blinky answered, cinching his lap belt a notch tighter.

The flight to the mountains was relatively uneventful. With Blinky's help in dead reckoning from the charts, they found the tiny landing strip and then spotted the lodge some five miles away.

"Let's announce our arrival," C. R. said cheerfully as he cobbed the power and racked the 172 into a steep bank.

"Let's not, chief" Blinky complained. "I don't think our wing safety program authorizes that sort of thing."

"Wing safety program? You mean all that lip service? Everyone knows mission reliability is the name of the game. Besides, what's this got to do with safety?"

"Come on, chief — let's just land so we can get back before we find ourselves in trouble. Shall I call the tower?"

"Ain't no tower here, son. Just like Vietnam. Let me show you how we used to make an assault approach," C. R. said, forgetting about the buzz job.

They rolled out on a high final with Blinky commenting on how short the runway appeared.

"No sweat, Blinky," C. R. said with his usual bravado. "I'll just pop the flaps, chop the power, and dump the nose." And he did.

Blinky tried to grab the controls at the last minute, but by then C. R. realized what he had done and had the wheel firmly pressed against his rotund belly. The Cessna rotated into a full stall and hit the ground short of the runway with a sickening crunch. It bounced once, landed on the runway, and stopped. The wings had a very noticeable droop to them, and if C. R. could have seen the main landing gear, he would have noticed both were badly sprung.

Blinky spoke first. "I'll bet it didn't take you long to run out of airplanes in Vietnam, did it?" C. R. just sat there, familiar thoughts churning through his murky brain.

* * *

It was late that night when the tired twosome got back to base. Their forlorn Cessna, its wings removed, had been loaded on a flatbed truck — an inglorious return. C. R. hoped the commander would be in bed so he would have till morning to dream up answers to the inevitable questions. He was wrong again.

C. R. and Blinky found themselves at attention in front of a tired and unhappy commander. For C. R. it was a familiar feeling; for Blinky it was terrifying. The commander speaks:

"I can't believe it! Look at the list of Air Force, wing and aeroclub rules you violated. Look at the broken airplane. Look at you . . . you're both lucky to be alive. Don't you understand why we have rules and regs to govern our actions? It's to prevent people like you from doing things like you did!

"I can't tolerate willful violations of directives. Major Terror, an Article 15 will be drawn up in your name. Lieutenant Donovan, you will receive an official letter of reprimand for going along and not dissuading Major Terror from his illicit activities. You both may consider yourselves grounded and restricted to base pending findings of the investigation. Dismissed!"

As the pair saluted and turned to leave, the commander continued, "You know, Terror, thanks to today's events, I'll probably have to close down our aeroclub. That means a lot of people who obey the rules and enjoy private flying here will have to suffer for your irresponsibility."

* * *

As C. R. and Blinky were leaving the headquarters building, the All-American Ego finally had something to say, "Isn't that just like a commander?"

"What do you mean?" Blinky asked.

"Threatening to close down the aeroclub everytime there's some minor incident. But, you know what the worst thing that happened today was?"

"What's that?" Blinky asked, hard pressed to select from his choices.

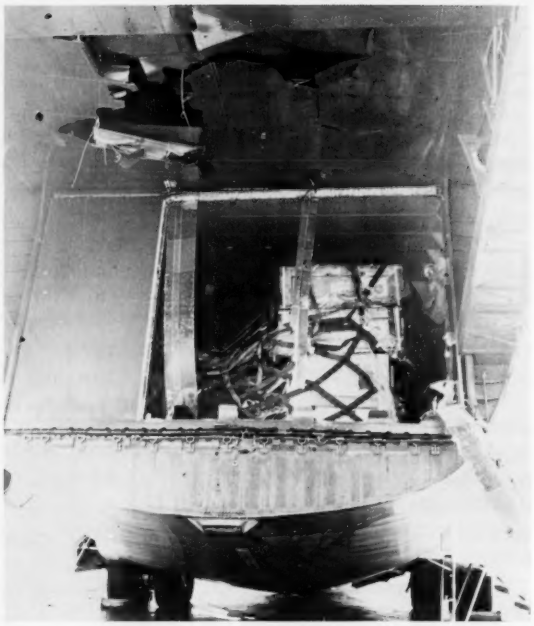
"Not only did we fail to see the girls, but in all the excitement, I forgot to pick up my portable potable kit!"

A high altitude

pressure leak may be...

The Hiss that Leads to Hypoxia

by Maj Gus Arellano, MAC/IGYF



The departure and initial climb were normal. But just as the C-141 leveled off, and without any warning, there was a muffled sound and the cabin rapidly filled with fog. Before everything was under control, one crewmember had lost consciousness, another experienced symptoms of hypoxia, and both pilots had trouble getting their oxygen and communications systems hooked up.

The rapid loss of cabin pressurization at high altitude is always serious and requires the quick response of all persons involved. The crew of this C-141 found out just how quickly they had to respond when the number two escape hatch opened. Five crewmembers — the engineer, scanner, third pilot, navigator, and ACM flight surgeon — got their masks on quickly and experienced no difficulties. This was not the case with the other four on the crew.

The copilot, his mask immediately available, quickly donned it, but he couldn't get the microphone switch to work. He found himself getting plenty of oxygen but unable to communicate.

The aircraft commander had a problem with the quick-donning harness. The neck strap on his harness was loose, rendering the harness useless. The AC finally ended up holding his mask up with one hand and flying with the other, certainly not the most efficient way to fly an airplane.

The second navigator experienced a slight case of misidentified oxygen masks and put on the loadmaster's instead of his own. No real harm in this — except the loadmaster had not turned his regulator "on." Fortunately, the ACM flight surgeon noticed the navigator was having problems and turned his regulator to emergency.

Now, with the navigator using the loadmaster's mask, guess who had a problem? The loadmaster, of course, and for two reasons: not only was someone using his mask, but he was back in the cargo compartment, actually beneath the hatch when it came open. He attempted to return to the cockpit but was unable to open the door. He then went back to try to use a passenger mask but lost consciousness before he could don one. He was found on the floor a few minutes later and was revived using a portable oxygen bottle.

The AC aborted the mission; all crewmembers were examined by the flight surgeon and all were released to fly again.

This incident, one of our more serious decompressions, was only one of eighteen cases of inadvertent loss of pressurization in the C-141 and C-5 in the last fifteen months.

The question that immediately arises is, What is being done? First, we are interested in fixing the basic causes of the decompressions. Then, we want to supply the finest life support equipment available.

Of the eight decompressions in the C-141, five were caused by failures in the ramp locking system and three were the result of number two escape hatch problems. Each hatch failure has been different. Why the hatch

opened in the incident described in this article was never positively determined, but it probably had not been properly closed and checked before flight. The other two hatch failures resulted from delamination and corrosion in the honeycomb section of the hatch. To prevent future problems in this area, all number two hatches in the inventory were inspected and a few with minor defects were removed from service. In addition, the hatches are now reinspected at each isochronal inspection. Also, a change to the Dash One is pending which will require a closer preflight inspection of this area.

The ramp locking mechanisms failed because of improper rigging. The problem was compounded by the inability of the crew to check for a positive over-center condition of the locks. To correct these problems, new rigging procedures have been developed and are currently being tested. Additionally, an inspection port is being prototyped so the crew can visually check the over-center lock for proper position.

Number two is the one that blew.

The ten C-5 decompressions pose a different problem since each was caused by a different type of failure. However, the C-5 problems *can* be corrected — through proper documentation of discrepancies and proper repair, rigging, and inspection of the forward and aft door complexes. Home station maintenance men are receiving specialized training on repair and rigging of the visor, pressure door, and ramps. This training will soon be provided for en route maintenance troops as well.

Actually, a lot of work is being done to correct known deficiencies. The changes and refinements that are being made to present equipment and to maintenance and operating procedures should go a long way toward reducing if not eliminating the decompression problems we've had.

There are also many changes in the life support area. Several new pieces of equipment are being purchased and new procedures are being developed to make the equipment we now have more reliable. Here are some of the recent developments:

★ A new sweep-on crew oxygen mask is in the *final* testing phase and will *soon* be available in the field.

The new improved sweep-on life saving and communicating oxygen mask.

★ A new smoke mask with an exhalation valve and a communications capability is being purchased.

★ New procedures have been developed for packing C-141 and C-5 passenger oxygen masks.

★ Life support units have been instructed to tack the quick donning harness straps.

★ Charts like the following, depicting the duration of the walk-around bottles under various conditions, will soon be included in all jet aircraft Dash Ones.

Typical Chart
MA-1 Portable Oxygen Bottle with A-21 Regulator
Expected Duration Time — Normal Breathing
Charged Pressure, 300 PSI

Altitude	15,000 ft	25,000 ft	35,000 ft	42,000 ft	Above 42,000
Regulator Setting	Normal	Normal	30M	42M	Emergency
MB-1 Fire Fighters Mask	6 Min	6 Min	50 Sec	35 Sec	30 Sec
Pressure Demand Aircrew Mask	7 Min	7 Min	6 Min	4 Min	3 Min w/no mask Leakage

These are the changes being made to our aircraft and life support equipment. On one hand, these changes will greatly reduce the probability of having a rapid decompression. On the other, the new life support equipment will help crewmembers better cope with a decompression if it does occur. But don't forget: the real key in a rapid decompression will still be the individual crewmember. Take care of your gear, know where it is, know how to use it, and don't be caught off guard.

Preflight in haste...

Repair at leisure

The following two stories from FAA Aviation News are for all light airplane buffs. However, the moral of each one is true for anyone who flies.

A Long Walk to St. Louis

Aircraft fuel tanks, like Noah's menagerie, usually come in pairs: mains, auxiliaries, and tiptanks. On most aircraft the latter two are optional. Tips, of course, are hard to overlook, but auxiliaries, being inside the wing, are another matter. They can easily be missed in preflight by the small plane pilot who has never known anything but mains. His education on this subject can progress very rapidly if his ignorance leads to power failure over rough country, as in the following incident:

The problem began when MacPherson, the sales manager, committed himself to a noon demonstration of a Meyers 200 to a prospect in Pittsburg, Kansas. It was nearly ten in the morning when he made the appointment, but in the speedy Meyers it was no more than a 90-minute flight from St. Louis. So it did not appear that he was cutting it too fine.

But when he called over to the line office and asked them to gas up the airplane, he was told that the refueling team was busy with two big twins, and it might be half an hour before they could top him off. Not so good.

He did some rapid calculation in his head. The Meyers held 80 gallons; 40 inboard and 40 out. He had topped the mains yesterday morning, but had taken up two customers during the day, maybe an hour and 30 minutes flying altogether, and the Meyers burned about 15 gallons per hour. He had flown off the mains so they should have about 10-12 gallons left. He kept the auxiliaries half full, another 20 gallons; he could burn them off en route and fill the mains in Pitts-

burg. No problem (he thought).

After checking the weather the sales manager bumped into a young pilot who was building time toward an instrument rating.

"Where you headed, Mac?"

"Over to Pitt. Be back this afternoon. Got a prospect for the Meyers."

"Want some company? I need some hood time."

"Sure. You'll have to get it on the way back, though. I'm due in at 12 noon."

"Let's go!"

As they started out the door the sales manager heard himself being paged for a phone call.

"Shall I preflight her for you, Mac?"

The sales manager nodded, hardly hearing, his eyes on the big clock on the sales office wall. He found himself half-hoping the call meant a cancellation from Pittsburg.

It turned out to be from his wife, reminding him that they were out of dog food. It was a quarter after ten when he got to the plane. His young friend was wiping gasoline from his hands.

"All set, Mac."

"You use the checklist?"

"You bet."

"All right, let's wind her up."

They were off at 10:25, and MacPherson laid a direct course southwestward for Pittsburg, ignoring the VOR doglegs. The weather was great, clear as a bell. Within an hour he was over Pommes de Terre Reservoir, trueing 200 mph. As he scanned the panel his eyes came back to the main gages, where the needles were flickering toward empty.

"Better save something for landing," he said, and switched over to right auxiliary. Almost immediately the engine began to cough and sputter, "Something in the line," he muttered, and switched over to the left aux tank. The engine gasped, choked and finally quit.

"Mac, I can't swim!"

"Sit still."

He switched back to the left main and went through his restart procedure . . . **throttle retarded, mixture full rich, fuel pump on** . . . the windmilling prop cranked the big 285-horse engine, and after sputtering for a moment it roared back to life.

Photo by Sgt. Bill Talley

Start out with plenty of fuel.

They had dropped down to 2,600 feet, but Mac decided against using up his dwindling fuel to climb back up. A quick glance at the chart and he headed south for Buffalo, only 20 miles away. Engine leaned, he switched cautiously from one main to the other as the needles flopped listlessly against the peg. His campanion did not appear to be breathing, until the runway came into view. Rolling out, MacPherson asked the inevitable question:

"Want to bet there's water in the tanks? What kind of checklist did you use?"

"My own. I always carry it with me."

"Does it say anything about auxs?"

"Oxes? On an airplane?"

"Aux tanks — auxiliary tanks, not oxes!"

His young companion looked over his checklist carefully and shook his head. "No, it's not listed on my airplane."

"How'd you like to buy this one?"

"I don't think so."

"How'd you like to walk back to St. Louis?"

* * *

Splitting up preflight duties will certainly cut time and get you off the runway sooner. But remember: any interruption while splitting duties is likely to lead to a missed item or the assumption that George did it. The consequences can range from the comical to the tragic, as the following story illustrates.

Even Spit Would Have Worked!

The couple had lingered longer than they realized in the coffee

shop of the airport, talking flying in general and having a good laugh with friends over the silly blunders of pilots they knew who never could accept the idea that flying is a serious business. As they walked out of the building they realized that they would have to hustle if their in-laws in Aurora, expecting them at noon, were not to be kept waiting and perhaps given cause to worry. They considered delaying long enough to telephone, but that could get complicated, and probably would involve revising their flight plan, getting a new weather briefing, etc., so they decided to carry on as planned, hoping to pick up a little time en route.

To help matters along, they divided up preparation chores, the wife parking the car while the husband pushed the Lark Commander out of its hangar; wife readying the charts and other flight gear while husband stored their luggage aboard. They were certainly not about to skip the preflight inspection, but they agreed to save time by sharing the task. Both started at the tail and worked forward on either side. The husband, who worked swiftly and competently, finished his side first and met his wife at the leading edge of the port wing. Both gave a "thumbs up" sign of everything in order, and they climbed into the airplane. The wife, who needed flying time, took the lefthand seat.

They had the taxiway to themselves and, following a careful run-up and look-around for traffic, they charged down the runway. After about 100 feet of roll the Lark was light on the mains, and the husband pointed his thumb skyward. The wife was about to ease the wheel back when her eyes, scanning the instruments, rivited on the airspeed indicator, which registered zero.

Husband: "Get it up! What's the matter?"

Wife: "We've got no airspeed. Look at it!"

Husband: "What?"

A quick look at the instrument, a glance at the remaining runway, and the husband chopped the throttle. He took the controls and hit the brakes as soon as he dared. The runway was long enough but it was also sprinkled with dew, and just before coming to a halt the airplane skittered off the pavement. There was a sharp "clunk" up front, and the nose sank slowly below the horizon.

Wife: "I think we busted something."

Husband: "I don't think we're going to Aurora today."

As they waited for a tow from the maintenance hangar, wife, in tears, ran her hands over the damaged prop and nose gear. Husband moodily fingered the pitot tube cover designed to open automatically from wind pressure.

Husband: "Expletive!"

Wife: "What is it, dear?"

Husband: "The cover was stuck. That's why we weren't showing airspeed. A drop of oil — a measly drop of oil . . . Even spit would have worked."

Wife: "Oh, dear."

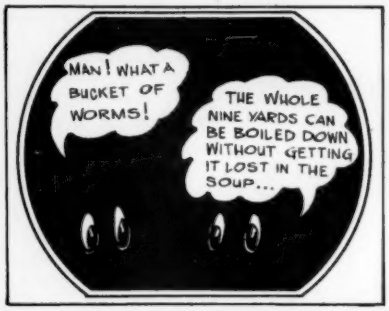
Husband: "Didn't you check it on the preflight?"

Wife: "I know, but you came around, and so I thought surely . . ."

They took the bus to Aurora.

Photo by Sgt. Bill Talley

A few extra minutes spent on preflight may save hours later.



What Communications Gap?

by Capt Marvin Davis, Hq AAVS

Jargon! Defined as confused, unintelligible language, it's caused more than one accident. Accident reports (sometimes filled with jargon themselves) contain many cause factors stemming from lack of good communication. We're sure that you've heard good communications stressed ever since your first day in the Air Force. As crewmembers and maintainers, we must continually communicate — either through the written word or verbally — to keep our planes flying safely. Crew briefings, trip reports, 781 entries, and cockpit communications demand accuracy and precision — there's little place for jargon. This article not only captures an extreme use of jargon, but is in keeping with this April first season.

* * *

Not long ago I was relaxing in front of the TV watching an old William Holden movie. You remember the one where he was a former Korean POW trying to get a job as a test pilot at Edwards? Well, Lloyd Nolan played the general who said, "I just received a T-W-X from headquarters." He didn't say "twix" like we do in the real Air Force. I immediately chastised their technical advisor for allowing them to make such a blunder.

Well, the joke was on me. In an Air Force film documenting the SAC bombing competition, Gen Holloway pulled a piece of paper from his pocket and said, "I received this T-W-X from Secretary Laird . . ." Imagine that! All this time I had been saying "twix" when it was actually "T-W-X."

This started me thinking about some of our terms for everyday events that could sound like Greek to the uninitiated. For instance, I was sitting in my office minding my own business when a friend came in and said, "I really can't get a feel for this bucket of worms. It's got such a short fuse on it we don't have time to grease the skids. We're behind the power curve already and if we don't get our feet on the ground it might fall through the crack. I've been trying to pass the buck to the headshed for the whole ball of wax and get them off dead center, but they only gave me additional guidance to bring me up to speed. You know the old man is brown shoe all the way and is as hard-nosed as they come. He said he's locked in concrete. He also said that being the fast burner that I'm supposed to be, it should be a piece of cake. I can't fight the system by myself, so that's why I came to you. Maybe you can clear the air and help me get a handle on it."

I replied without hesitation, "Well, we should be able to smoke something out and check off this block in short order. This whole nine yards can be boiled down without getting it lost in the soup. We laid the groundwork for this turkey when it was further upstream so we should be able to knock something out. If we sift through the heap and massage it long enough and then add some staff feedback, we should be able to come through with a ball park figure.

"I know MAC is between a rock and a hard place on this one," I continued, "because USAF needs a position statement ASAP. The answer we buck up to MAC might have to be quick and dirty until we have more breathing room to check it out, but at least it will get them off our backs. Our experience factor indicates we might be able to milk it for all it's worth, pad it a little, water it down some, then skim off the cream, and finally ask for more lead time. Then we'll run it by the old man first to make sure we don't get hurt. I think if we cinch up and get with the program it should be a no-sweat situation."

Well, that was just the answer he needed. He thanked me for my help and trotted off smiling. No sweat.

You know, if Hollywood flicks about the Air Force had the benefit of our expert technical advice, there would be no communications gap between the technicians. But how about the popcorn crowd who paid to see the flick?

Refraction Reaction

Light, water, and curved glass often combine to create a hazard. This is particularly true of curved windshields on light airplane windshields. During flight through rain a water-swept windshield acts as a prism and can create serious problems.

For example, an object, such as a runway, looks lower and farther away through a rain-swept windshield. From the pilot's point of view, he thinks he is higher than he actually is. This of course suckers him into flying a lower than normal glideslope.

Some experts say that it's possible to visualize the horizon 1,200 feet lower than it really is. This equates to about 200 feet for each half mile inbound.

To help combat this phenomenon, use windshield wipers if your aircraft is so equipped and pay extra attention to your altimeter — even though you may have visual contact with the ground.

— Idaho Rudder Flutter

Camouflaged Calamity

We've all seen camouflaged equipment but few of us have ever seen conclusive evidence that the camouflage really works. After landing at an overseas base not too long ago, a C-141 crew did. Their aircraft touched down 2,500 feet past the runway threshold. During the landing roll, the pilot suddenly saw a camouflaged communications van parked next to the runway — it was too late to take evasive action! The Starlifter's right wingtip clipped the van and the wing burst into flame. There were no injuries but the big transport was severely scorched.

It seems the crew had been led into a trap. Their route briefing had not mentioned the possibility of a van next to the runway. The tower operator, who knew about the van, said nothing until the '141's wing was burning. And the people who had parked the van were apparently unaware that the C-141's wings were wider than the narrow runway.

The accident investigation board restaged the mishap. They flew an approach to the same runway while an identical van was parked in the same spot. The investigators' unanimous conclusion was that the camouflage on the truck was so good that no one could have seen it in time even if they had known it was there!

— PACAF Professional

If panels were meant to fly they'd have wings, not fasteners.

Cpl R. W. Liddiard, Air Clues

Meeting Adjourned

The following safety meeting minutes, duly signed by the 12 members of the safety council present, were submitted to the commander:

The subject of this month's meeting was "accidents." We read the Five-Minute Safety Talk entitled "Accidents Are Caused." The impact of the subject was profound, and at the conclusion of the reading a heated discussion arose.

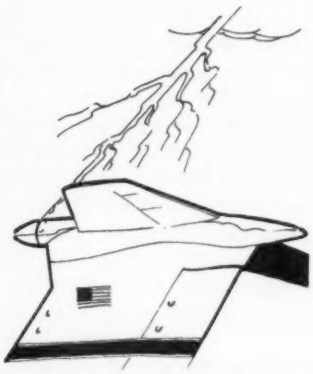
During a lull, a member of the group raised his hand to ask a question and accidentally knocked a coat off the rack and over the head of a second member. While removing the garment, the temporarily blinded member struck the window with his elbow, scattering glass all over the floor.

In picking up the glass, two others got cuts on their hands. The group leader grabbed the push broom to sweep up the mess, but, due to the crowded room, he caused either the handle of the broom or another member moving out of the way to dislodge a fire extinguisher from the wall, which fell and discharged, spraying the rest of the group with chemicals.

The member who originally raised his hand to ask the question said he forgot what he was going to say and instead complained of the cold air coming in through the broken window. Since there is no cure for the common cold, it was decided to adjourn the meeting, and the members went back to work.

— *Navy Safety Review*

Ramp Zaps



Last summer, during a weather hold at a MAC base, two maintenance men were disconnecting static grounds on a C-5 when lightning struck the tail. Fortunately the men were not killed but both were knocked to the ground and severely stunned. A flight surgeon examined them, found them unhurt, and returned them to duty.

Rest assured the next time thunderstorms are in the area these two troops will probably stay behind in the line shack. In this particular case the weather was starting to clear and the aircrew and maintenance men were anxious to get the mission off.

In a similar case the weather looked clear when a C-141 was struck by lightning soon after it blocked in. The crew had departed the aircraft before lightning from a passing thunderstorm struck the T-tail and discharged to the ground through the scanner's cord. Luckily no one was on the headset at the time and there were no injuries.

Maybe, if a weather hold is in effect, an all clear should be given from the weather shop before anyone ventures back out on the ramp. What's the procedure at your base? Does it need to be revised?

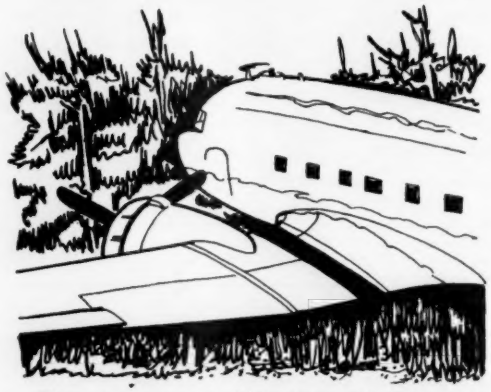
Who's Not Paying Attention?

A recent foreign-civil aircraft accident was attributed to the copilot deploying the spoilers instead of raising the gear just shortly after takeoff. Several other major accidents have been attributed to the spoilers being deployed when another flight system was called for. These accidents remind us of the need to speak plainly and distinctly. Good communication is definitely an ingredient of safe flying.

It's hard to comprehend how the words "gear" and "spoilers" can be confused (at least in English), but they have been. This leads us to believe that there may be another associated problem: dis-attention in the cockpit! Personal problems, wool gathering, being behind the airplane, or thinking about the hot time you'll have later today — all can distract you from the job at hand.

From the time you strap in until the time you clear ACP, your mind should be on flying your airplane. Amen.

Unforgiving of Human Error



There is a maxim which states, "Aviation, like the sea, is not inherently dangerous but is terribly unforgiving of any incapacity or neglect." These words were never truer than when applied to a recent fatal accident of a sister service.

The C-47 is a venerable old bird which probably has been around longer than the majority of pilots flying today. It is likely that more flight hours have been accumulated in this aircraft than in any other aircraft. Despite this, and the fact that it is a very forgiving airplane with a proven safety record, accidents do occur because of human failure.

A C-47 had returned to the traffic pattern after completing its assigned mission, and the aircraft commander took the controls for the final full stop landing. He flew a normal VFR pattern to touchdown.

After touching down, the aircraft developed a left swerve which the aircraft commander attempted to correct with left throttle. The added power was sufficient to swerve the aircraft toward the right side of the runway at an estimated 45-degree displacement from the centerline. A go-around was attempted by adding full power to both engines with airspeed approximately 75-80 knots. The aircraft became airborne but struck the tops of tall trees immediately beyond the base perimeter. However, it continued to fly at approximately 150 feet AGL, in a shallow right turn.

Because the aircraft was vibrating, the aircraft commander called for gear up. He then stated on the intercom that they had lost an engine and to feather number two. Shortly thereafter, the third pilot, who was sitting aft, observed the number 1 engine go into feather with an accompanying loss of all engine noise. The aircraft commander than said, "You feathered the wrong one, bring it back in, bring it back in!" The aircraft struck some tall trees, crashed, and burned.

Clearly, emergency actions must be well thought out and learned ahead of need, then consciously and carefully applied.

— USN Weekly Summary

Student Safety Standards

We found this list of student pilot safety rules in the Iowa Aviation Bulletin. We reprint it for the benefit of our many student pilot aeroclub members.

1. Your student pilot certificate must be endorsed, by a flight instructor, for each make and model of aircraft that you fly solo.

2. Your local flying area must be designated by your flight instructor. You may not fly solo outside that local flying area until your flight instructor endorses your student pilot certificate for solo cross-country flight.

3. Before each solo cross-country flight, your preflight preparation and planning must be reviewed by your flight instructor and he must endorse your log book. Certain exceptions to this rule are provided in FAR 61.73.

4. You may not carry passengers, nor may you act as pilot-in-command on a flight beyond the U.S. borders; nor may you fly for compensation or hire, or in the furtherance of a business.

5. If you have not flown within the last 90 day period, you must demonstrate your competency to solo an aircraft and have your log book endorsed by your flight instructor. For exceptions to this rule see FAR 61.73.

after deadline . . . .

SOUND OFF -- The C-141 was heading east at FL 330 when the controlling center asked the crew to turn right 30 degrees. Then, in short order, there occurred: a request to expedite descent to FL 310, a call sign mix-up by the center, and a near-miss on a civil airliner. The AC promptly submitted a hazard report, but there was an administrative delay before AFISC passed it to FAA. Sixty days after the incident, the answer came back that this "circumstance" could not be productively investigated due to the delay in receiving the report. If the crew had immediately declared their intention to file a report, the necessary tapes and records would have been on hand. Making such a declaration puts the controlling agency on notice that an investigation will be made.

FUEL PLANNING MANUALS -- Wouldn't you like the pages in the base ops fuel planning manuals to be neater and more readable? There are two methods which might make this possible. First, ask profile users to be more careful; second, add a protective coating to the pages.

Only a few of the fuel profiles, the 31,000 to 37,000-foot constant altitude and step climb charts, get heavy use. All it takes is a plastic overlay to protect them. Base ops folks: heed the hint. Flight crews: apply some pithy comments where they will get the desired results.

OLD WRITER RETURNS -- This month's C. R. Terror feature, honorable mention winner in last year's writing contest, was penned by Maj Charlie Brown, a TMF graduate. Maj Brown, assigned to 438 MAWg Safety Office, was the most prolific writer ever to serve on our staff.

A TWIN FOR FANNY? -- We've received a suggestion to conduct a Fanny Flyer look-alike contest. If you -- or a friend -- have a striking resemblance to the gal who graces "Quick Stoppers" each month, slip on a flight suit, pose for a photo, and fire a copy our way.

COMING ATTRACTIONS -- Featured for May will be airlift command posts, instructor philosophy, compressor stalls, helos and hot weather, and eyes.

☆ U. S. GOVERNMENT PRINTING OFFICE: 1973-769-627/8

N7175C

N22205

N19795